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From the Editors:

LESSONS TO LEARN

Twenty years ago, North Carolina's population was almost evenly split between metropolitan and non-metropolitan residents. By the year 2000 that split has changed to 67 percent metropolitan and 33 percent non-metropolitan.[1] The planning implications of this change in rural communities cover the spectrum, from economic development, housing and real estate, to transportation, land use and environmental protection. In this issue of *Carolina Planning*, we present case studies, original research and a planner profile that can be added to a planner's tool box of innovative solutions to age-old challenges.

Smart growth – it's not just for cities. Our opening article rises to the challenge of applying smart growth principles to rural areas. Amber Levofsky presents a variety of problems that face many growing rural communities and shares six case studies that provide real-world solutions.

What do Charlotte, North Carolina and Bogota, Colombia have in common? Answer: Bus Rapid Transit (BRT). The second article, by Felipe Targa and Daniel Rodriguez, tackles an emerging urban transportation technology: Bus Rapid Transit (BRT). Through their research in Bogota, Colombia, they explore the question: "Does instituting a BRT system impact adjacent land values and if so, how?"

Who's who in North Carolina planning? Inspired by the many guest speakers that come to the Department of City and Regional Planning (DCRP) from around the state, the editors of *Carolina Planning* are instituting the *Planner's Profile*, a section of the journal in which professional planners reflect upon their experiences in the field. In our first *Planner's Profile*, Roger Waldon, Planning Director for Chapel Hill, comments on the highs and lows of being a planning director and offers valuable insights. If you would like to contribute to this new section, please contact the *Carolina Planning* editors.

Also included in this issue is a list of the Master's Projects completed by the DCRP graduating class of 2003. Take a look to see what the newest members of the planning field have been up to.

[1] U.S. Census, *Demographic Trends in the 20th Century*, November 2002. http://www.census.gov/prod/2002pubs/censr-4.pdf

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Smart Growth: How It is Helping Rural America

Over the last several decades, rural populations have been growing at an exponential rate. While some rural communities have accommodated this growth through low-density development, other areas are employing smart growth techniques in an effort to preserve open space, ensure adequate affordable housing, integrate land use and transit, and encourage compact, mixed-use development. This article identifies the growing pains common among rural communities and highlights the accomplishments of seven communities that have successfully leveraged development strategies for the betterment of their communities.

Amber Levofsky

Introduction

Over the past fifty years, the boundaries of metropolitan areas have expanded, transforming many rural communities into today's suburbs. As metro areas continue to grow, rural communities will play a critical role in absorbing population and economic activity. An abundance of available land and relatively low development costs make rural communities attractive places for public and private investment. As Andrew Isserman remarked in a recent piece, "Much of what is considered rural America today will be urban America in 2050."[1]

Metropolitan expansion has contributed to the economic diversity of rural America: economic shifts have created rural economies driven by the service and manufacturing sectors as much as by farming or ranching. As industry in rural areas has grown, so too have population levels and the geographic boundaries of these areas. As such, rural communities today find themselves facing the growing pains typically associate with suburbs: traffic congestion, a lack of affordable housing, loss of farm and ranchland, high costs of providing public services, and loss of rural character. Over the long term, such growing pains threaten the unique blend of activities, assets, relationships, history, market conditions and distinctiveness of rural communities. This paper sets out to discuss the challenges faced by rural communities as a result of this growth and how those challenges have evolved into success. Within this context, the paper will also outline the different patterns of sprawl and present case studies highlighting smart growth successes in addressing rural sprawl.

Amber Levofsky will graduate from the University of North Carolina at Chapel Hill with Masters degrees in Regional Planning and Business Administration in 2006. She has worked on smart growth policy issues for the United States Environmental Protection Agency in Washington, DC. She also has experience working with local governments in North Carolina and New York.

Six Types of Rural Sprawl

The Vermont Forum for Smart Growth examined key features of sprawl in a diverse cross-section of Vermont communities. The researchers identified six types of sprawl development in their examination of communities across Vermont. While the classification is specific to Vermont communities, it can be easily applied to the different types of sprawl that affect rural America.[1] Each type of sprawl yields different costs, and presents different planning and policy challenges.

Six sprawl patterns are:

1. *Scattered residential lots in outlying areas.* Most rural communities consist of scattered residential lots in outlying areas. In general, these house lots have been created away from village, downtown or growth center areas. Homes are often sited off main roads on long driveways, cul-de-sacs or loop roads.

2. *Housing developments in or near town centers, with a suburban pattern and comparatively large lots.* Beginning in the 1970s, developers began locating rural housing developments along major corridors and closer to the town periphery. These subdivisions feature larger lots, wider streets and greater setbacks than do traditional village settlements.

3. *Multi-lot, planned housing developments on new access roads in outlying areas.* In more developed rural communities, residential subdivisions of nine or more mid-sized lots have often been sited away from town centers, typically with a new, separate access road. They are often in isolated areas, not near commercial services, town services or local industries. In resort areas, these developments may include condominium projects that are near ski areas but not integrated into compact ski villages.

4. *Commercial strips.* Occurring outside village and town centers and along major connecting roadways, commercial strip development is a linear pattern of individual uses, primarily single-story buildings, each with a separate driveway or curb cut and a private parking area. Parcels tend to be as broad as possible, in order to take advantage of highway exposure. A commercial strip is entirely developed for auto traffic and rarely includes residential neighborhoods or accommodations for pedestrians.

5. *Other commercial and industrial areas with large lots and inefficient layouts.* New commercial and industrial areas have often been developed away from town centers and residential neighborhoods, either at interstate highway exchanges or along major connecting roads. These areas have large lots, with large buildings set far back from the road, surrounded by parking areas. Uses in these areas may include retail, office, warehousing and industrial operations, but residential uses are not included. The roads are usually wide and are designed for high-volume car and truck traffic.

6. *Outlying location of public buildings.* Public buildings – including schools, town offices, post offices, police and fire departments, libraries and churches – are the focus of a community's daily activity. Relocating public buildings outside of town centers can contribute to sprawl patterns because they take with them the places that bring people together. They can be reached only by car, thus becoming inaccessible to a segment of the community. Retail often follows the lead of public buildings. For the last three decades, rural areas across our country have seen continued economic leakage from downtown to outlying edge locations. Many rural downtowns face high vacancy rates and a poor mix of retail tenants.

Smart Growth Implementation Challenges Facing Rural Communities

Smart growth policies have been rapidly gaining favor over the past decade. Increasingly, communities are making use of the new and evolving approach to land development, which promotes mixed-use developments, open space preservation, and offers suitable transportation alternatives to automobile travel. The rewards of smart growth policies have come in the form of protection of water and air quality, reduction in traffic congestion, and maximization of the public infrastructure.

Smart growth techniques demand a tailored, thoughtful approach to individual challenges as well as an understanding of local circumstance. The Smart Growth Network, a non-profit education and advocacy organization, has developed general guidelines that can be used regardless of place or community type and that can be incorporated into community plans and the development process. When followed, they provide a sound roadmap for growth in rural areas.[2]

While suburban and urban areas have made use of smart growth tools, many rural areas have not. The slow adoption of smart growth principles among leaders in rural areas may be the result of a lack of the resources necessary to carry out these techniques. For example, many rural and small communities do not possess the resources to keep a professional planner on the local government's payroll. In addition, some rural communities lack comprehensive plans or even zoning ordinances, which makes it more difficult to control and direct growth. Some communities also lack access to education and training on advances in land use planning and smart growth.

In addition, many rural communities do not have access to sophisticated planning technologies, such as Geographic Information Systems (GIS) and Planning Support Systems. Even when they have access to these technologies, a community may face difficulties in accessing appropriate data. Many of these communities do not have the staff or financial resources needed to develop local data sets. Free data is often available only at a regional or aggregate level. Such data does not always provide the necessary detail for localized land use planning.

Smart Growth Solutions for Rural Areas

Smart growth approaches, when implemented correctly, provide the opportunity for rural communities to address the problems described above. Rural governments across the country have effectively used smart growth strategies to develop communities that meet quality of life goals, protect sensitive resources, build healthy and diverse communities, and address regulatory and fiduciary matters in innovative ways. Below are descriptions of growth challenges facing rural communities followed by a short description of a case study that describes how one community confronted the challenge. The complete case studies follow this introductory section (see pages 8 through 19).

1. Maintain Community Character – As strip malls and subdivisions overtake rural landscapes, communities lose their unique attributes, sense of place and community character. Local leaders strive for a community development plan that brings quality jobs in a manner that safeguards the environmental, cultural and historic assets that are essential for preserving quality of life. Even where this desire exists, lack of funds and the proper development methods make it difficult to achieve a sustainable economic development plan that also maintains community character.

Preserving Community Character: Madison, Indiana The Collaborative Management Project involves 66 agencies and businesses working together to improve the life of residents in Madison, Hanover and Jefferson Counties. As part of this work, Madison developed a plan that embraces the smart growth concepts of concentrated development and mixed uses as a mode of improving and maintaining community character and economic vitality.

Innovative Planning: Flower Mound, Texas Flower Mound, Texas has a Smart Growth program which is designed to minimize the adverse effects of rapid growth and ensure

that the growth that does occur matches community objectives. The program is a comprehensive, community-based growth management strategy that translates the vision and values embodied in the Town's Master Plan into concrete development criteria.

2. Preserve Natural Areas - Development activity in rural areas threatens to convert farmland, forests and other natural resource areas into low-density, single-use fringe development. While a certain level of growth is often welcome and needed to sustain a rural economy, conventional development patterns can result in the loss of the natural assets that make rural areas attractive for living, working and recreation. In addition, loss of natural amenities can exacerbate environmental problems including erosion, flooding and air pollution.

Linking Natural Resource Protection with Economic Development: Hancock County, Maine Planners with Hancock County realized that growth and development pressures were resulting in a loss of prime farmland, increased traffic and sprawl. To address these concerns, the County created the Locally Grown Foods Program to capitalize on the increased attention to local farming, and the Low-Impact Forest Program to ensure that high quality woodlands are protected and that cultivated woods do not threaten the surrounding environment.

Providing Financial Incentives: Chester County, Pennsylvania In an effort to stem the tide of sprawl development, county officials initiated a regime of outreach and planning to garner feedback from local residents and coordinate the land use regulations of the various municipalities. The Chester County Planning Commission Vision Partnership Program (VPP) Grants provide technical and financial assistance to municipalities or groups of municipalities, to implement Landscapes, the county's comprehensive plan. The VPP provides funds to municipalities for developing or revising municipal comprehensive plans other Municipal Planning Code documents and other planning-oriented special projects. Municipalities can only enter the program after signing a Memorandum of Understanding with the CCPC.

3. Provide Adequate Affordable Housing – Many rural areas suffer from a lack of affordable housing. Approximately 21% of all rural households pay more than 30% of their monthly incomes on housing; any amount over 30% is considered a cost burden. Of this 21%, almost half use half of their incomes toward housing costs.[3] A disproportionate percentage of the burdened falls upon renters.

Creating a Range of Housing Choices: Breckenridge, Colorado The Wellington neighborhood in Breckenridge, Colorado provides affordable and market-rate housing on a site that was once dredge-mined. The project recycles land, creates housing for working families, provides a free transit shuttle to the nearby downtown, and helps the region avoid sprawl.

4. Increase Transportation Access - Sparsely populated rural areas often suffer from little or no public transit. Approximately 38% of rural residents have no public transportation (compared to 63 % nationally) and a further 28% live in areas with negligible service. A full 95% of rural residents depend on personal vehicles.[4]

Many counties have lost intercity bus and rail connections as deregulation led to a dropping of many of their less economical routes. The difficulty with providing either publicly or privately operated transportation services to rural areas is that low population densities within service areas have consequently high costs per passenger trips when compared with more dense service areas. Providing transit service is further constrained by limited public revenues with which to improve roads, maintain local airports or provide transit services.

Transit Oriented Development: Central Point, Oregon Central Point identified a need for directing its growth and development in a manner that would make the community more livable. The development of a project called

Twin Creeks is Central Point's first opportunity for community leaders to implement their policies of smart growth development. Twin Creeks is planned to be a 230-acre, mixed-use, transit-oriented development

5. Institute Regional Governance –Local independence is a powerful right whether in a rural, suburban, or urban community. Making decisions about issues that cross political borders is never a simple process, yet when faced with the challenges of growth, the solutions are sometimes best achieved with regional coordination.

Coordinating Regional Development: Cayuga Lake Watershed, New York Five New York counties and numerous cooperating agencies joined together to protect Cayuga Lake, which is both economically and environmentally vital to the people of the region. Created through an Intermunicipal Organization, the Cayuga Lake Watershed Management Plan recommends strategies for improving and protecting the water quality of Cayuga Lake and its tributaries, thereby helping to sustain the economic, environmental and social benefits of the areas water resources.

6. Utilize Existing Infrastructure and Public Services– The former Congressional Office of Technology Assessment estimated that low-density development resulted in increasing infrastructure costs from 10 to 20%.[5] Thus in rural and small communities, sprawl can threaten economic vitality because the investment in public infrastructure and services that sprawl necessitates is often too great for the existing tax base of many rural and small communities. Local governments and existing residents subsidize these public services when existing infrastructure in older areas are underused. Instead of using existing infrastructure, communities use the existing tax base to build new infrastructure targeted at supporting new growth.

Building new infrastructure rather than maintaining what already exists can lead to the abandonment of older parts of the community, and can force out older residents unable to afford the increased tax rates necessary for the new infrastructure. Rapid growth also limits the ability of fire, police and the educational systems to effectively serve existing and new populations without incurring higher costs. When compared to compact planned development, sprawl growth patterns result in 600% higher police response times, 50% higher ambulance response times, and 33% higher fire response times.[6] In addition, many once-rural areas are experiencing overcrowded schools and a tax base too small to support the increased enrollment.

Conclusion

This paper has attempted to investigate the growing pains faced by rural communities in hopes of providing usable examples for meeting those pressures head on. In most instances, growth is inevitable. All levels of governments can be flexible in how they respond to the demands placed on rural communities and the corresponding support needed by rural communities. While preserving natural resources is a major concern of managing growth, our primary objective in writing this paper is to provide to rural communities examples and hope that they, like the communities examined, can preserve quality of life, ensure economic vitality, and create an aesthetically stimulating environment that fills their residents with pride.

Winston Churchill said, "First we shape our environment and then our environment shapes us." When asking rural communities to recognize that managing growth in a way that promotes sustainable communities is an important goal, we then must provide relevant resources for rural decision makers and planners. As this paper shows, smart growth can facilitate successful responses for other rural communities once tailored to their specific demographics, economy, and needs.

The case studies described in the above section are found on pages 8 through 19.

Preserving Community Character: Madison, Indiana

Background: Madison is located in southeastern Indiana's Jefferson County on the banks of the Ohio River. Across the river lies Kentucky, with Louisville only 55 miles southwest of Madison. Cincinnati, Ohio is 75 miles northeast of the city and to the northwest you will find Indianapolis, Indiana, 95 miles away.[7] Currently, a city of 13,000 people, Madison is a thriving industrial, commercial and residential area also known for its rich farmland. Madison's tourism industry stems from its historic character, thus a great deal of effort has been devoted towards its preservation. Consequently, the National Trust designated Madison as one of 12 Distinctive Destinations of 2001 for Historic Preservation.[8]

In 1996, the closing of the Jefferson Proving Grounds, a federal military base, negatively impacted the local economy. However, with the advance of the information age, many people from nearby urban areas were able to move to Madisonwhile maintaining their city jobs. This new growth added development pressures at a time when the area was experiencing economic problems.

Project Overview: The closure of the military base was just one strain on the local economy. The recent tobacco settlements have also had detrimental effects on the tobacco industry; Jefferson County was nationally one of the largest tobacco producers. Additionally, local farmers began to sell their produce and buy their supplies outside the county, removing a major source of business that the local economy had relied on. The decline in agriculture and the large residential population growth resulted in conflicting development pressures. How was Madison to develop in a way that integrated economic return with environmental quality?

Madison and Jefferson County sought a solution: encourage new development to improve the economy and handle the pressures from an increasing population while maintaining its historical, 'Main Street' town character and preserving rural landscapes. Local municipalities worked together to use federal funding assistance granted for closure of the military base to fund the creation of a strategic plan. A steering committee representing governmental, business, agricultural, and financial interests developed a regional plan to direct growth in order to maintain a rural and small-town atmosphere while attracting new businesses and improving the economy. The committee identified Madison as the most threatened by residential growth and noted that growth should be carefully planned around Madison in order to protect existing open space, including the bordering Clifty Falls State Park, from encroachment. Thus, three areas were created for commercial development, emphasizing mixed-uses while minimizing impacts to nearby residential areas through buffering and landscaping.

The plan also controlled downtown and riverfront development to ensure a diversification of uses that will appeal to residents, tourists, and the college community alike. On the County level, the plan emphasized focusing future residential development around existing towns, taking advantage of existing infrastructure and minimizing pressures on and conflicts with surrounding agricultural areas.[9]

Concurrently, MIDCOR, the Madison-Jefferson County Industrial Corporation, conducted a marketing analysis of the county's strengths and weaknesses. The work of both MIDCOR and the steering committee yielded plans emphasizing controlled growth for the city of Madison and Jefferson County. In an effort to take full advantage of the strategies and information provided, the Collaborative Marketing Project (CMP) was formed to meld both plans into a common goal. The CMP consists of 68 non-profit, government, private, and educational agencies,

which have pooled their resources to fund the project.

The CMP facilitates the retention/expansion of existing industries and attracts new, complimentary industries to Jefferson County and Madison. CMP has encouraged tourism by emphasizing the area's 19th century heritage as a quaint, beautiful and living reminder of "bygone riverport communities" resulting in a 12% increase in 2001 and a 16% increase in the first quarter of 2002.[10] Another CMP project underway analyzes the retail market of downtown historic Madison, the residential and commercial districts, Hanover College, and the agriculture market. Despite the wealth of market analysis, no group before CMP has ever endeavored to analyze the agricultural retail market. CMP hopes that the study will help in identifying methods to improve the local agricultural economy.

Madison, Indiana, has embraced the smart growth concepts of concentrated development and mixed uses as a mode of improving and maintaining community character and economic vitality. In so doing, the greater Madison area successfully increased tourism, attracting businesses and residential growth to town centers, thus relieving pressures to develop surrounding agricultural areas and open natural spaces.

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Innovative Planning:
Flower Mound, Texas

Background: The Town of Flower Mound, a historic namesake site honoring sacred Wichita Indian burial grounds, lies along the northern edge of Grapevine Lake, a few miles north of Dallas/Fort Worth International Airport. A decade ago, barely 15,527 people lived in this sleepy cattle and farming town. Today, Flower Mound's population exceeds 51,300, ranking this young community among the nation's fastest growing towns. Caught up in the competitive growth race typical of many municipalities in the Dallas/Fort Worth region during the early 1900's, the town's 230% expansion began to take its toll on roadways and bridges: municipal services and capital infrastructure. As a result, the town experienced serious wastewater problems, overcrowded schools, traffic congestion on already clogged and aging roads, and depletion of century-old trees, habitat, and other natural resources in a ecologically sensitive area of north central Texas.

Frustrated with the town's haphazard growth, in 1996 homeowner Lori DeLuca formed a political action committee called Voters United, a group comprised mostly of homeowners, business leaders and concerned citizens. The group petitioned town hall and elected representatives to address growth. Today, on her third term as Mayor, Lori is a focal player in shaping town policy. Her first act as mayor was to update the town's master plan by establishing growth policies and designing standards for building and site design, building setbacks, tree preservation, signs, parks, trails, and open space. To ensure new growth would resemble the town's vision Flower Mound instituted a 13-month moratorium on residential construction until the new plan and design standards were complete. Through most of the 1990's, city officials routinely issued more than 1,200 residential building permits a year. The number of residential construction permits dropped to 874 in 2001. Through March 2002, the town issued just 135 such permits. Flower Mound has since doubled its wastewater treatment and drinking water capacity and issues contracts to improve roadways and bridges to keep infrastructure capacity in pace with continued population growth.

Project Overview: The town council adopted a smart growth plan in January 1999 to help manage the rate of growth and to promote quality development, infrastructure polices and the guidance necessary to direct future growth. The first three elements of the new plan included an update of the town master plan, a temporary moratorium on new residential development plans and amendments to the building code to prevent stockpiling of building permits upon announcement of the impending moratorium.

In February 2002 the Town Council adopted the Strategically Managed And Responsible Town Growth Plan, known as SMART Growth, as the fourth and final component that now guides development. The plan includes a set of guidelines called Threshold Zoning Criteria, which evaluates the effects of development proposals on existing infrastructure. The guidelines are designed to maintain and support the community rural character and open space quality of life. For example, new proposals for water and wastewater must not exceed 90% of current capacity; new roads and intersections must be at level grade or above; combined parkland town-wide per 1000 population must attain at least 7.75 acres by the year 2001and 9 acres by 2002; elementary, middle and high schools cannot exceed 110% capacity; average Priority 1 response time to public safety cannot surpass 4.5 minutes for Police and 6.5 minutes for Fire and EMS; all federal regulations pertaining to wetland protection must be met, and sensitive sites require professionally prepared habitat protection plans; and, homeowner taxes cannot exceed 75% of the Town's tax burden.

The Threshold Zoning Criteria includes provisions guiding future development in ecologically sensitive sites. Flower Mound's unique location in a rapidly urbanizing area of the Eastern Cross-Timbers Prairie and its desire to maintain an open space/farmland character requires careful planning considerations. For example, an open space zoning overlay for the Cross Timbers Conservation Development District was created to protect Post Oak trees, many of which are in the 400 year old range. The overlay is designed to protect open space, natural landforms, agricultural landscapes and scenic vistas that create and define the community's unique character. Also protected are topographical slopes, drainage areas, wetlands and habitat. In addition, the zoning criteria for sensitive open space areas outside the Cross Timbers Conservation Development District now require submission of habitat protection plans for approval by professionally qualified wildlife biologists. Habitat protection plans are required to ensure integrity of green corridors and connectivity for wildlife movement.

New residential development property and sales tax revenues must now be equal to or greater than the town's corresponding cost of providing municipal services, thereby eliminating developments that are a financial burden to the tax base. Community officials also established a new Smart Growth commission for the sole purpose of conducting annual quality reviews of the management plan's overall effectiveness. The commission, comprised of representatives from the planning and zoning commission, real estate industry, and the community development field, serves as a recommending body after reviewing any amendment or update to smart growth programs, holding public hearings and making recommendations to the planning commission.

SMART Growth creates more certainty in the development approval process by allowing developers to complete projects in a more timely and cost effective manner while at the same time attracting new development to Flower Mound. Since the passage of the plan, four new office developments, a bank, grocery stores and several office-retail plazas, a new high school, a fire station, churches, apartments and homes have been built. However, not unlike the approval process itself, development now takes place in a more orderly and quality-controlled manner. Despite threats of litigation and complaints from some developers, no lawsuits have been filed with respect to the smart growth plan, the moratorium or management plan. Now the development community can plan ahead more easily. The ground rules for development are now standardized, removing any trace of the arbitrariness that plagued the former process.

Even the best policy solutions cannot remedy 50 years of uncontrolled growth overnight. Yet, even as the smart growth plan continues to take effect, residents have begun to experience immediate improvements including ongoing roadway and infrastructure capital improvements, increased quality commercial development built in appropriate areas and increased preservation and enhancement of open spaces. Flower Mound has taken a considerable step toward ensuring that the natural beauty, charm and character that initially drew residents will be preserved and enhanced for

years to come. In June, 2000, EPA's Region 6 Water Quality Protection Division made a special Recognition Award to the Town for their outstanding contribution to Smart Growth and livability for incorporating ecologically based principles into their municipal land use plan to protect easements, wetlands, scenic vistas, and habitat buffers integral to water quality protection and environmental quality of life.

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Providing Financial Incentives: Chester County Pennsylvania

Background: The recent history of Chester County in southeastern Pennsylvania is a familiar tale told throughout the United States. In the decade between 1980 and 1990, the county's population increased 18.9% and the number of housing units increased by 26.7%.[11] Much of the resulting development manifested itself in low density, automobile dependent patterns of housing, retail, corporate, and industrial centers that consumed and fragmented open space, farmland and natural areas throughout the county. In fact, new development in Chester County impacted more land in the last 25 years than in the previous 300 years. Open fields and woodlands disappeared throughout the county while nearby towns suffered the loss of residents and commerce associated with diminishing agricultural land. This uncoordinated and uncontrolled growth quickly threatened the vitality of the county by diminishing the character of the communities, increasing taxes and traffic, and jeopardizing valuable natural resources and environmental amenities.[12]

Project Overview: In an effort to stem the tide of development, county officials initiated a regime of outreach and planning to garner feedback from local residents and coordinate the land use regulations of the various municipalities. The commission's outreach involved an intensive public participation process that included:

- Preparing and distributing over 100,000 newspapers inserts explaining the issues and concerns relating to the sprawl-like development pattern occurring throughout the County and encouraging response through a survey.
- Meeting elected local officials and planning commissions to gain input with respect to their communities on various options for future patterns of development.
- Making presentations to professional, service and civic organizations, homebuilders, and attorneys on the issues of the impacts of sprawl and the impacts on the County.[13]

In March of 1995 the Chester County Planning Commission conducted a public opinion survey of more than 5,000 county residents. The survey indicated that citizens favored, by a ten-to-one margin, a return to less land intensive development designed within the fabric of existing communities.[14] The commission received similar feedback from officials representing the various municipalities during several regional workshops.

Based largely on the feedback garnered during the earlier outreach, county officials, in conjunction with a committee representing local governments, community groups, advocacy groups, landowners, local businesses, and utility companies, developed the final countywide land-use plan called Landscapes. The plan advocates the creation of livable landscapes as an alternative to sprawl and is designed to achieve the following goals:

- Land Use - Preserve and enhance the diversified mix of urban, suburban, rural, and natural land uses through municipal cooperation and by concentrating development.
- Resources - Sustain and enhance natural, scenic, and historic resources for the benefit of current and future generations while accommodating planned growth.
- Economic Development - Achieve and maintain a healthy business climate to ensure continued sound economic growth, and to preserve the quality of life that has made Chester County an attractive place to live and work.
- Transportation - Provide an intermodal transportation system to optimize mobility, strengthen the economy, protect the environment, and support the Vision for Chester County.
- Community Facilities - Provide accessible community facilities and services, which meet residents' needs through the cooperation of the public and private sectors.
- Utilities - Provide utility facilities and services to meet all needs in the county, protect the environment and public health, and support development consistent with the future Landscapes pattern.
- Housing - Provide diverse, affordable housing to meet the needs of all households, located in a manner consistent with land use goals.
- Human Services - Provide for the human service needs of all county residents.
- Public Health - Provide for the public health needs of all county residents.
- Planning and Coordination - Achieve a high level of intergovernmental coordination and public-private cooperation as a model of government efficiency in Pennsylvania.

The County established incentives to encourage the various municipalities to voluntarily adopt the Landscapes plan. One such incentive, entitled the Vision Partnership Program, makes $50,000-$70,000 available to each municipality willing to implement the vision by partnering with the County.[15] In addition, the county provides funding assistance for resource protection projects, and directs community development grants towards urban and suburban municipalities committed to revising housing ordinances to increase affordability. The County Planning Commission's efforts have been overwhelmingly successful, as 71 of the 73 municipalities have joined the Vision Partnership Program and are working towards the county's goal. One township in particular, Wallace, instituted a multi-tier zoning policy that encourages developers to incorporate open space in their plans. In 1999, the American Planning Association awarded Chester County with the Outstanding Planning Award for a Plan for their Landscapes Plan-Vision Partnerships Program.

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Linking Natural Resource Protection with Economic Development: Hancock County, Maine

Background: Like most rural counties throughout the nation, business in Hancock County revolves around the use and preservation of its land. The mix of industries has historically included tourism, forestry, retail, services, construction and agriculture. Prior to 1970, the business trend was a decrease in and consolidation of farms. Developers and property owners saw farmland as ripe for development since residential and commercial development brought a higher return on investment. This trend toward development of the land continues today, even though the County has shown a renewed interest in agriculture, mostly attributed to the market value for agricultural

products like blueberries that doubled to $30 million in the last five years.

According to 1997 census data, there were 310 farms in Hancock County, a 20% increase in the number of farms since 1992. The number of small farms that are less than 49 acres in size has increased by 50% from 1987 to 1997. This represents an attitude shift for county residents, planners, developers and property owners to strengthen the County's role in an agrarian economy. Other contributing factors include an understanding that the high quality soils in Hancock are best suited for farming and that preserving the natural beauty and landscape of the region will help in maintaining the County's character.

The increased farming trends include a significant proliferation of small-scale agriculture in the coastal region of Hancock County. Additionally, the coastal Hancock region is also a huge tourist destination, especially in summer months. The people who visit are eager to sample the local beauty, culture and food. More than four million people annually visit Acadia National Park, located in Hancock County, to camp, fish and hike its pristine coastline trails.

Planners with Hancock County realized that growth and development pressures were resulting in a loss of prime farmland, increased traffic and sprawl. Other effects include the loss of character that has made the County such a unique and special place. To address these concerns, the County created the Locally Grown Foods Program to capitalize on the increased attention to local farming, and the Low-Impact Forest Program to ensure that high quality woodlands are protected and that cultivated woods do not threaten the surrounding environment. For a county that depends on its agricultural and forestry heritage, preserving farms, for both food and lumber, and an agrarian economy was essential.

Project Overview: The work that Hancock County is doing to help local food growers and small wood lot owners develop niche markets is not something the typical visitor notices. Rather than focus solely on attracting new employees to the area, the Planning Commission is building markets and adding value to existing small-scale, natural resource-based operations.

Two programs are concurrently operating in Hancock County to combat unchecked growth and provide options for preservation of the rural landscape. The Locally Grown Foods Program encourages farms to produce food for use by area restaurants. Through the program, farms producing fruits and vegetables for local consumption are assured a market for their goods, which adds to the jobs mix for local residents. The creation of job opportunities through small-scale natural resource-based businesses that know and cater to local customers is vital to ensuring that the economy is working to produce capital that will be invested locally. These businesses are generally owned by people who have a long-term stake in the community, and buying locally as opposed to buying from farms that are part of larger conglomerates ensures that profits are not sent out of the local economy.

Nearly 30 restaurants in the county are participating in the Locally Grown Foods Program, which began in 1995 with the help of a grant from the U.S. Department of Agriculture. The county encourages this program beyond the fact that it preserves land and helps to bolster the local economy. From a smart growth perspective, the program contributes to area's sustainability by providing necessary resources to the community that would not otherwise exist if farmland were converted to other types of development.

Two years later, the county started the Low-Impact Forestry Program. The program encourages foresters to log lands in a sustainable fashion. The mission of the program is to promotes:

- A long-term management perspective
- A view of the forest as an eco-system
- Less destructive logging practices
- High value markets for products harvested using low impact methods
- Management for multiple objectives including social and community values and productivity of the forest, broadly defined.[16]

Long-term management ensures that soils and other vegetation in the forest are protected, with an end result of a logging system that is environmentally sensitive. Low Impact Forestry could be considered a jobs creation program, as it employs around three times the number of loggers as mechanized high-grade and clearcutting operations. Industrial forestry has yielded a near 50% decline in forest-related jobs in Maine over the past decade.[17]

Hancock County received a grant from the Ford Foundation in 1999 to increase cooperation among the areas' small wood lot owners. To bring value to the area's wood products, the Planning Commission then assembled an initial group of 40 landowners for green certification through the National Wildlife Federation's Smart Wood Program. The state Planning Office affirms that the program provides incentives for property owners to consider the long term impacts and sustainability of the county when harvesting land for forest products.

From a smart growth perspective, this project illustrates that land designated as open space and forests—even acreage designated for logging—can be preserved and maintained while remaining economically productive. Low-impact forestry necessitates that work is done with care by individuals instead of large-scale automated clearing mechanisms. This system results in the logging of only those trees that are appropriate, while preserving those that are not. This process results in minimum damage to trees, soils and other vegetation. The State of Maine encourages other counties to adopt similar programs to assist with the preservation and stabilization of open space throughout the state. Such policies result in sustainability of land, decreased development pressures, and increased understanding of the benefits of maintaining land in its natural state.

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Creating a Range of Housing Choices: Breckenridge, Colorado

Background: The Town of Breckenridge, Colorado is known around the world as home to one of the most popular ski resorts in the United States. Located in the north central region of the state, 86 miles west of Denver in the Rocky Mountains, the Breckenridge Ski Resort has been operating since 1961. During the 2000-2001 season alone, 1.4 million skiers visited the resort – the second highest number of visitors to any ski resort in North America.

As a result of its overwhelming popularity, the town of Breckenridge has witnessed substantial growth in population and demand for second homes. In 2001, the town's permanent resident population reached 2,803, up 120% from 1,285 in 1990. The estimated peak population of the town, including residents, second-home owners, skiers, and day visitors, approached 34,886, an increase of 60% from 21,729 in 1990. As a consequence of this explosion in population and the corresponding demand for additional housing, the community quickly faced a dearth of available affordable housing. Many of the community's permanent residents now face a crisis in housing costs because of growing housing cost burden (typically denoted as the percentage of total household income devoted to housing costs). According to a recent study, nearly 40% of local households are paying in excess of 30% of their income for housing (the standard for affordability) and 7% pay more than 50% of their income (the mark of excessive cost burden). Although home prices increased 121% and rent 87%, wages increased just 35% between 1990 and 1997. In conjunction, growing employment throughout the area has lead to an increase in the number of people who must commute from other counties to their jobs in the Breckenridge. In fact, local workers commonly travel 40 or 50 miles to find an affordable home.

To remedy this gap, the Town adopted its *Affordable Housing Strategy* ("the Strategy") in 2000. The strategy contains a comprehensive analysis, the community's immediate and long-term housing needs and identifies several program options to address these needs. According to the

strategy, the community requires 400 units of affordable housing to satisfy immediate demand, and 60 additional units each year thereafter to continue to meet projected growth.

To create and manage the necessary affordable housing programs, the Town of Breckenridge partnered with the local Summit Housing Authority (SHA). Through this partnership, the town has developed a variety of tools to retain and increase the number of affordable housing units available for residents. In conjunction with SHA, it monitors approximately 225 units with restrictive covenants guaranteeing occupancy by local employees, assuring that workers can live near their jobs. An alternative policy ensures that there is distribution of affordable housing within the community. A fair-share housing policy places a deed restriction on a number of properties within a new development that restricts ownership of those properties to households earning less than a specified percentage of the area's median income (ranging from less than 80% to more than 120%). Additionally, these restrictions typically include a resale cap that limit the amount that a house can be sold for in the future, assuring its continuation as an affordable property.

Community officials introduced several additional programs within the *Affordable Housing Strategy*, including a land banking program for future housing development, an accessory dwelling unit program, and employer-assisted projects. The Strategy also proposes waiving density limits for affordable housing projects and requiring developers to mitigate new commercial and residential development by providing additional affordable housing. The Strategy is already beginning to bear fruit.

The Wellington neighborhood, one of the latest projects to emerge under the Strategy, recently received high marks for providing affordable homes and encouraging smart growth principles. Positioned atop a reclaimed dredge mine site one mile from downtown Breckenridge, Wellington incorporated deed restrictions that require occupants to work full time in the Town or in surrounding Summit County into 80% of the 123 homes in the development. Project planners targeted home prices for people who earn between 90% and 140% of the area median income, approximately $42,279. Consequently, the deed-restricted homes sell for approximately $100,000 less than the market-rate homes, starting at around $250,000. In addition, annual appreciation of the deed-restricted homes is also capped at the greater of, the annual percentage increase in area median income or 3%. By way of comparison, local developers estimate that similar homes in the area without restrictions will appreciate about 10% to 15% per year.

In addition to single-family homes, the Wellington Neighborhood offers townhouses, duplexes, and live/work units (a unit or building designed to accommodate non-residential uses in addition to or combined with living quarters). This diversity increases the opportunity for home ownership by households of varying income levels. The neighborhood is organized around a system of "greencourts," open spaces that serve as a shared front yard for the homes that front onto them and provide pedestrian access to the street network.

Two other recent projects, Vista Point and Gibson Heights, also provide affordable homes. Of the 57 homes in the Vista Point development, 18 have deed restrictions to guarantee affordability. Likewise, all of the 40 homes in the Gibson Heights development are restricted for households earning less that 80% of the area's median income.

The policies and projects described above have helped the Town progress towards its affordable housing goals. Nonetheless, in July, the continuing need for additional housing lead the town's Planning Department to propose the elimination of provisions in the community's performance zoning ordinance authorizing the waiver of affordable housing requirements in exchange for other amenities, such as landscaping. The Planning Department is now studying the effects of eliminating performance zoning, after receiving approval to do so from the Town Council.

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Coordinating Regional Development: Cayuga Lake Watershed, New York

Background: The Cayuga Lake Watershed is located in the picturesque Finger Lakes region of central New York State, covering 785 square miles of agricultural, residential, industrial, and forest lands. The watershed is part of the Oswego River Basin, from which 48% of the total runoff flows through the lake before its final destination in Lake Ontario. The watershed covers 6 counties, 44 municipalities, and is home to over 120,000 people, most of whom get their drinking water from the lake. The watershed contains many of the region's vital economic and environmental resources, supporting agriculture, tourism, recreation, real estate, and local industry and commerce. Important natural resources include abundant wildlife, parks, fisheries, wetlands, forest, and water.

Lake Cayuga is the longest, widest, and one of the deepest of the eleven Finger Lakes, and has over 140 streams flowing into it. The New York State Department of Environmental Conservation (NYSDEC) 1996 Priority Waterbodies List included Cayuga Lake and its tributaries due to impairments to water supply, fishing, fish propagation and survival, aesthetics, boating and bathing. The watershed has been under assault from a number of pollutants including excess nutrients, sediments and silt, oxygen demand, pesticides, thermal changes, water level and flow, pathogens and unknown toxicity. Sources of most of these pollutants include streambank and roadbank erosion, agriculture, construction, urban runoff, septic systems and stormwater. The adverse impacts on the watershed are of environmental, social and economic concern, and include loss of water quality, aquatic habitat, and economic growth.

In early 1996, the Town of Ledyard (representing all other interested parties in the region) received $65,000 in funding from the New York State Department of State's Division of Coastal Resources for the first year of a three-year project to develop a Cayuga Lake Watershed Management Plan. The significance of having such a plan is linked to the 1996 Clean Water/Clean Air Bond Act, which specifically allocated $25,000,000 for water quality improvement projects to Finger Lakes municipalities that are included in a watershed management plan. The Cayuga Lake Watershed Management Plan project is being funded by the NYS Department of State's Division of Coastal Resources through the State's Environmental Protection Fund.

Project Overview: The Cayuga Lake Watershed Restoration and Protection Plan (RPP) serves as a working guide for the public, elected officials, farmers, business community, environmentalists, and others to manage Cayuga Lake's valuable water resources. The RPP was proposed in response to the environmental degradation occurring in the watershed, and the desire of the local community to ensure the watershed remains an abundant economic and environmental resource. An inter-governmental organization and committees were formed in order to share ideas and resources. The watershed crosses numerous jurisdictional boundariesis and is located in a predominantly rural area where local governments are functionally autonomous. As such, collaboration was necessary for effective watershed protection.

An Intermunicipal Organization (IO) was formed in 1996 to oversee and assist in evaluating the present condition of the watershed and to make recommendations for the watershed management plan. The members of the IO consist of 31 municipalities throughout Cayuga, Cortland, Schuyler, Seneca, Tioga and Tompkins Counties, as well as other various stakeholders in the Cayuga Lake Watershed. The IO provides direction for the regional planning boards and other staff, and oversees the entire project. According to the organization's mission statement, the IO strives "to recognize the interrelatedness of all activities within our watershed and to collaboratively and collectively work to address issues and problems. The goal is to promote understanding that is vital to maintain and improve the ecological health and beauty of the watershed along with building and maintaining a productive economy and also sustain a healthy social environment for the people of the Cayuga Lake Watershed."[17]

The IO has five additional partners that carry out various research and support functions in support of the RPP. The Cayuga Lake Watershed Network (CLWN), a grassroots non-profit organization, is devoted to protecting and sustaining the health and well being of the entire watershed. Their goal is complimentary to the planning effort proposed by the IO. The role of the CLWN is to work with the IO's planning effort on communication, coordination, and information dissemination about the planning process. The Central New York Regional Planning and Development Board has been designated as the project administrator. Technical and educational assistance is being provided by the Genesee/Finger Lakes Regional Planning Council, Tompkins County Cornell Cooperative Extension, and Cayuga County Cornell Cooperative Extension. Funding for the Cayuga Lake Watershed Restoration and Protection Plan program has been provided through the NYS Environmental Protection Fund via a grant from the NYS Department of State Division of Coastal Resources Local Waterfront Revitalization Program, as well as through a grant from the NYS Empire State Development Corporation. Substantial volunteer time and local dollars from the watershed partners have also been provided toward the effort.

The IO has established a list of goals that are shared by the organizations, the cooperating municipalities, and the partner organizations:

- Minimize non-point-source pollution of both surface and groundwater in the watershed.
- Remediate existing pollution and degradation.
- Preserve open space and natural resources.
- Develop compatible components of their comprehensive plans and zoning and natural resource ordinances.
- Understand ecosystem dynamics within the watershed in an effort to prevent and/or respond to threats to its integrity.
- Work with federal, state, and county agencies and authorities to assure that their activities in the watershed are compatible with the plans and programs of the cooperating municipalities.
- The expansion of economic activities consistent with the watershed environment.
- Resolve disputes regarding development projects that impact environmentally sensitive areas.
- Resolve disputes regarding development projects with inter-municipal impacts.
- Share the costs of monitoring compliance and enforcement of regulation.
- Develop programs for educating the public and public officials.
- Explore mutually beneficial ways of securing and sharing federal, state, and county-agency funding for the programs that accomplish their objectives in the above areas.

Several of the elements within the RPP and the planning process are consistent with the principles of smart growth. The project's primary focus is on protecting a very large natural resource and does not address urban design and transportation issues. The project does contain strong elements for three of the remaining smart growth principles: preserving open space, farmland, natural beauty, and critical environmental areas; fostering distinctive, attractive communities with a strong sense of place; and encouraging community and stakeholder collaboration in development decisions.

The Cayuga Lake Watershed is an area that supports an abundance of recreational and agricultural activities that depend on maintaining a healthy environment. The IO's goals are geared to protecting natural areas, preventing non-point source pollution from developed areas, and working collaboratively with outside agencies.

Individuals and groups have been encouraged to participate in the planning process by working directly with the IO or local municipality, becoming a member of a committee, providing comments on plan drafts, attending public forums, or becoming an active member of one of the many non-profit organizations that are involved in the project.

Several groups and municipalities involved in the RPP have joined together to provide a watershed stewardship education program. The goal is to ensure that the watershed population is informed and actively involved in order to provide community leaders with the necessary support to continue forward with the RPP.

The natural beauty of the watershed is important for the community to maintain. The local residents recognize that they live in one of the most beautiful regions in the country, full of bio-diversity and history, which adds to their overall quality of life. The beauty of this region also draws many visitors for recreational opportunities that help bolster the local economy.

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Transit Oriented Development: Central Point, Oregon

Background: The City of Central Point is located in the Rouge Valley approximately 270 miles south of Portland. Medford, which is the closest major city, is the focal point for this region. Principle industries for the community include lumber, recreation and tourism. Aircraft manufacturing, the local school district, concrete manufacturing, trucking, and farm supply companies comprise the

largest employers. Central Point nearly doubled its population since 1990, to 13,460 in 2001. Rapidly increasing populations alarmed long time residents and prompted city officials to carefully consider all development projects.

During the mid-1990s the city identified a need to address the growth pressures that concerned residents. In particular, a 1997 strategic planning process revealed that new and veteran residents alike wished to preserve the small town feel of the community. They felt that this would address their concerns regarding rapid growth, consumption of farmland, overcrowded schools, traffic congestion, availability of parks and open space and reliable delivery of public services.

The city determined to guide policy and land development in a way that would coordinate and integrate growth through approving densities for residential and commercial development while encouraging land use to be oriented around transit; Central Point encouraged density to support transit-oriented development and preserve open space.

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Project Overview: Central Point identified a need for directing its growth and development in a manner that would make the community more livable. The development of a project called Twin Creeks is Central Point's first opportunity for community leaders to implement their policies of smart growth development. Twin Creeks is planned to be a 230-acre, mixed-use, transit-oriented development, designed by Portland-based McKeever/Morris, a division of Parsons Brinckerhoff Quade & and Douglas Inc. The project is designed for 1,500 residential units, and retail and office space. This high density urban neighborhood will be built around a central green and transit core to provide easy pedestrian access. This project is significant for Central Point because it actively addresses and plans for growth rather than allowing typical subdivisions around the community without any consideration for impacts upon the current infrastructure, pressures upon schools and loss of open space.

Central Point typically adds 170 to 200 new homes and 500 new residents per year. On standard half-acre lots, the usual population density is significantly less than that of the Twin Creeks project, and more land and resources are consumed. Residents began to vocalize their concern about this type of growth. The city council heard residents' apprehension to new growth and wanted to ensure that any new development would be sensitive to its surroundings and environment.

When McKeever/Morris approached the city council with a plan, they were met with skepticism. However, instead of taking the project elsewhere, the developer illustrated the merits of its innovative site plan. Convincing the city council and residents to support the plan took some time, but the key was involving all stakeholders in the decision making and planning processes. The developers encouraged public participation through a household survey and four open houses. After an exhaustive public participation process, residents understood the project's features and benefits.

Significant features of the project proposal include a landscaped gathering area; pedestrian access to downtown; a grid-layout system aligning existing street patterns; an emphasis on transportation circulation including a transit station hub and connectivity; and a new school within walking or biking distance for all schoolchildren. A development of this size and magnitude adjacent

to the downtown will help ensure that the urban growth boundary is consistent with its purpose: to direct growth toward the existing built environment. The proposal also includes several two-to four-story buildings with ground floor retail and commercial uses, and apartments above. Mixed-use multi-family developments will transition into the surrounding neighborhoods where single-family houses with front porches sit on 3,500 to 7,000 square foot lots.

Twin Creeks, a smart growth development, provides a multitude of benefits. First, it creates a livable community, where residents can interact with their neighbors due to proximity. It also provides an inviting layout of homes and design features that promote interaction with others in the community. Furthermore, the community is highly walkable with a focus on accessing goods and services on foot. All residents are no more than a 10-minute walk from a transit stop, a neighborhood commercial service center and jobs. The second benefit relates to the availability and accessibility of transit options. The regional transit district identified Twin Creeks as a transit destination that will generate projected ridership to satisfy this community for bus transit. In the future, if transit demand remains high, transportation planners would designate Twin Creeks as a terminus for a commuter rail line to the City of Ashland. The rail line would provide a transit option for commuters to various jobs in the area.

Overall, this project achieves various elements of smart growth, including preserving open space and natural resources, mixing residential and retail land uses on the same lot, providing a range of housing opportunities for various income levels, and creating a walkable community. While each of these elements is beneficial, the most significant aspect of the project is providing a transit-oriented layout to encourage a variety of transportation options.

This project has been highlighted in various local and regional publications in southwestern Oregon. It has also been designated as a 2001-02 Awahnee Award winner of the Local Government Commission.

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Planning News Briefs

DCRP Students Win Town of Hillsborough Design Competition

Rendering of Churton Street corridor re-design. Source: DCRP

Students of UNC-CH's Department of City and Regional Planning dominated a recent urban design competition for the Churton Street corridor in nearby Hillsborough, NC. As part of Assistant Professor Tom Campanella's "Theory and Principles of Urban Design" class, five student teams submitted competition entries and presented their work to a jury of community leaders. A variety of streetscape design components were proposed to enhance the identity and image of Hillsborough and to improve traffic flow and pedestrian movement. The Hillsborough Tourism Board, which sponsored the competition along with the Alliance for Historic Hillsborough, now plans to develop a Churton Street Corridor Improvement Plan based on the student schemes.

The winning plans were featured in the Durham Herald, and will be on exhibit at the Orange County Library in Hillsborough. Hillsborough is among North Carolina's most historic towns, laid out in 1754 by William Churton on land where the Great Indian Trading Path crossed the Eno River.

EPA Smart Growth Award for Wake Co. School

The Moore Square Museums Magnet Middle School, a new facility on a four-acre city block on the east side of downtown Raleigh, was awarded a 2003 National Award for Smart Growth Achievement. This acknowledgement is the first in the nation in the Public Schools category, which recognizes achievements in how K – 12 schools can adopt smart growth principles in meeting the educational needs of students.

The school's downtown location allows students to walk to museums and other cultural institutions as part of the daily curriculum. Additionally, the school is sited within the Downtown East Residential Redevelopment Area—an area targeted for housing and community development. The reuse of a once-blighted a city block has the potential to anchor increased reinvestment in the downtown neighborhood. These features mark distinct contrasts with more typical new school campuses in the Triangle that take shape as 35-40 acre greenfield developments.

Students outside Moore Square Mueums Magnet School. Source: EPA

CALL FOR PAPERS

Articles · Opinion Pieces · Case Studies · Book Reviews · Project Descriptions

Carolina Planning, a student-run publication of the Department of City and Regional Planning at the University of North Carolina-Chapel Hill, is currently accepting articles for our Fall 2004 and Spring 2005 issues. Our journal focuses on topics relevant to practicing planners in the Southeast.

Submission Guidelines:
We accept manuscripts of varying lengths, with articles ranging from 5,000-10,000 words. Please submit articles in electronic format- attachements to email will be accepted. Tables, graphics, and photos should be submitted as files separate from text.
Citations should follow the author-date system in the *Chicago Manual of Style*, with endnotes used for explanatory text. Legal articles may use Bluebook format. Please include the author's name, address, telephone number, and email address, along with a 2-3 sentence biographical sketch. Carolina Planning reserves the right to edit articles accepted for publication, subject to author's approval.

Submission Deadlines:
October 1 for Fall issue submissions
March 1 for Spring issue submissions
These dates are flexible. We accept submissions on a year-round basis. If you have any questions about your submission, please contact us via phone or email.

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Planner Profile: Planning in the Field

This piece marks the beginning of a series of interviews with North Carolina Planning professionals which will aim to offer insight into how planning takes shape in a variety of professional contexts.

Roger S. Waldon, AICP
Planning Director
Town of Chapel Hill
1983-present
DCRP Graduate, 1976

CP: Can you please describe your role as a planner?

RW: Planners take on different roles, depending on the organization and environment in which they work, and depending on the values and expectations of clients and constituents. In some settings, the planner needs to be an advocate for a particular idea or a particular project.

In Chapel Hill a critical community value is participatory governance. There is a high priority on making sure that everyone has the best and most complete information, with multiple opportunities to offer input and influence outcomes. Elected officials make the decisions. One of my most important roles is to manage the process, to make sure that all parties are represented and have fair and equal access to resources and decision-makers.

A second major role is to put ideas on the table for the community to consider. This is a combination of applying best planning theories and practices to local circumstances, helping the community create and implement a vision based on community values, and evaluating ideas and proposals to see if they match the vision.

CP: What has been one of your most contentious/ challenging projects?

RW: Meadowmont. This 400-acre new-urbanist development was proposed on the east side of Chapel Hill, on undeveloped land that was once a dairy farm. The proposal was highly controversial. Critics focused on traffic impacts and loss of open space; proponents focused on mixed-use, high quality design, pedestrian-oriented features, and an innovative, aggressive stormwater management strategy. There were many meetings, hearings, negotiations, and court dates. The project was approved and is approaching completion, and is now the subject of critical acclaim (by most).

CP: Who are some of the groups you partner with?

RW: It is increasingly common for the Town to partner with neighborhood groups in pursuing a variety of initiatives. In a current example, the Town Council agreed to work with the Northside Neighborhood Association (a neighborhood bordering Chapel Hill's downtown) to prepare strategies and regulations to help preserve neighborhood character. In this case, the Planning Staff meets regularly with neighborhood representatives to prepare new regulations. Other examples include joint sponsorship of workshops with the Chamber of Commerce, and affordable housing initiatives with a local nonprofit organization, the Orange Community Housing and Land Trust.

CP: What planning issues do you deal with on a regular basis?

RW: Key issues facing Chapel Hill are traffic, stormwater management, neighborhood preservation, University growth, affordable housing, and downtown development.

CP: What is one of your most rewarding experiences as a planner?

RW: In 1991, I made a trip to Gaithersburg, Maryland to study Kentlands, one of the country's first New Urbanist developments. Upon returning to Chapel Hill, the twin tasks began: working collaboratively with a developer to design a development along New Urbanist principles on a 350-acre tract just south of town; and working with the Town Council and community to discuss the value of this development form.

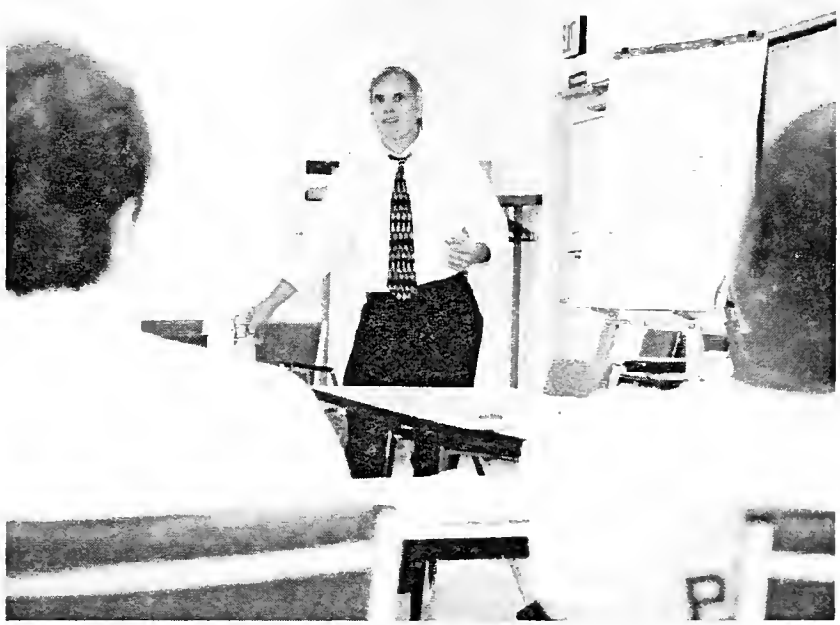
The result was Southern Village, a development designed and built along new urbanist principles, and featured in Time Magazine in 1999. The development is now complete, with a fine-grained mix of residential and commercial uses, side-by-side along narrow, tree-lined streets with sidewalks in front and alleys behind.

CP: What are some of the significant changes in the planning field that you have observed in your tenure as planning director?

RW: The most significant change I observe is the changing role of the planner - from a visionary who has all the answers to a community facilitator helping citizens articulate values and achieve results. The second most significant change is technology - sophisticated computer mapping and imagery that open doors to more participation and better analysis.

CP: At what level (local, state, regional, federal) do you see planning having the most impact, and why?

RW: The more local the work, the greater the impact on a particular community. I have enjoyed being a municipal planner and being able to see the positive influences of our planning program on a daily basis. Other planners I know savor the more global changes that can be affected at a larger level, through legislation, funding initiatives, and writing to introduce new ideas. And my consultant friends find satisfaction in taking the good ideas from one community and cross-fertilizing into other communities. For me, local government is where the action is most intense and interesting.



Roger Waldon engaging community members in planning decsions. Source: Roger Waldon

Analysis of Bogotá's Bus Rapid Transit System and its Impact on Land Development

Recent experiences in Latin American cities supporting world-class public transportation systems have resulted in the creation of livable spaces with a significant potential to spur land development. In cities like Bogotá, Colombia, and Curitiba, Brazil, bus rapid transit (BRT) has re-emerged as a cost-effective transportation alternative for satisfying growing demands for urban mobility. Bogotá's BRT system has allowed for a 32 percent reduction in average travel times and significant reduction in accident and air pollution levels along the busway corridors. Although previous research suggests that the impacts of access to BRT facilities on the nearby land value and use have been minor, new BRT systems like the one in Bogotá feature intensive infrastructure facilities and their effects in terms of accessibility and mobility have been impressive. This paper provides first-hand empirical evidence on the evaluation of how the BRT system is related to land development outcomes such as land values. Future BRT extensions will have a large potential to influence future land development and induce desirable urban forms and land uses around stations and busway corridors.

Felipe Targa and Daniel A. Rodríguez

Introduction

Urban transportation infrastructure, in addition to serving its explicit goal of providing mobility, historically has served as means of attracting and stimulating urban development. By effectively altering where people live, work, and how they travel, transportation systems have played a significant role in reshaping the location of activities, patterns of interaction, and growth of cities. Mimicking the experience of cities in developed countries, auto-centered transportation policies prevailed in most 20th-century cities in the developing world. However, recent experiences in urban areas that support world-class public transit systems suggest that rather than relying on automobile policies that reinforce patterns of seclusion and isolation, policies supporting mass transportation systems and favoring non-motorized transportation alternatives have resulted in the creation of livable spaces and the collective appropriation of these systems as images and symbols of the public.

Although initially decried by multilateral lenders, this quiet revolution is now heralded by planners and elected officials as an agent of urban redevelopment and sustainability. One element of this revolution is the provision of high quality bus transit service. With several successful cases

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worldwide, bus transit service has re-emerged as a cost-effective transportation alternative for satisfying growing demands for urban mobility while hopefully stimulating land development and livable spaces. This new concept for delivering bus service, known as Bus Rapid Transit systems (BRTs), is revolutionizing bus transit provision around the world, particularly in Latin American cities. BRTs like the ones in Curitiba, Brazil, and Bogotá, Colombia, are systems with lanes designated for exclusive use by large-capacity buses, and specialized bus stations with pre-board ticketing and fast boarding. These characteristics have drastically improved the level of service of bus-based transit systems including average speeds, reliability, and capacity.

However, despite the resurgence of bus transit services and the success of several BRTs around the world, there is limited research examining the relationship between BRT and land development. The paucity exists despite the fact that a careful examination of BRT impacts is critical for the transportation planning process. Potential mispercceptions of these impacts can lead to significant facility redesign, construction delays, or compensation to affected parties, all of which may amount to millions of dollars. Furthermore, the success of innovative infrastructure financing tools, such as value-capture, hinges on understanding whether or not positive infrastructure impacts are capitalized into land values.

This paper presents an examination of Bogotá's BRT system and its development as part of an integrated urban mobility and land development strategy. Additionally, the paper investigates the extent to which accessibility to the BRT system is capitalized into residential property rents as a measure of land values. Results from hedonic price models suggest a positive elasticity of local accessibility to BRT stations after controlling for proximity-related effects to the BRT right-of-way, structural, and neighborhood attributes. This empirical evidence has a wide range of practical applications, from determining the usefulness of innovative land-based tax instruments that hinge on the capitalization of positive effects of transportation investments, to informing policy-makers about the land development consequences of transportation infrastructure alternatives.

Bogotá's Urban Mobility Strategy

Bogotá, the capital of Colombia, has approximately 6.4 million inhabitants occupying 28,153 hectares (69,566 acres) of urbanized area (DAPD, 2000). This makes Bogotá one of the most dense cities in the world, with approximately 230 people per hectare. Despite a 1999 per capita GDP of US $2,300, 15 percent higher than the national average, Bogotá's automobile ownership rate (130 cars per 1,000 inhabitants) is low compared to cities in South America of similar size. Notwithstanding this low motorization rate, the city is greatly affected by severe mobility problems, partially due to the high population density. By 1999, the average speed during the peak hour on the main roads declined to less than 12 kilometers per hour (7.45 mph).

With approximately 70 percent of motorized trips taken by bus and other transit modes such as paratransit, Bogotá's quasi-deregulated and free-enterprise transit system had one of the largest per capita public transportation fleets in the world by 1996 (JICA, 1996). The excess of vehicle capacity and the lack of regulation resulted in low transit vehicle occupation levels, inferior to the minimum required to make the service profitable and efficient. The transit system was also complemented by illegal bus operations and inter-municipal services that originate in areas surrounding the metropolitan region.

Although many studies diagnosing Bogotá's mobility problems were conducted during the last decade , a long-term plan to achieve a desirable urban form and to promote its co-existence with an efficient and equitable transportation system was off the agenda of local administrations. This changed during the last two administrations of the city (1998-2001 and 2001-2004), when a sustainable strategy for the transportation system of the city was developed and implemented. In addition to providing competitive alternatives to auto-based

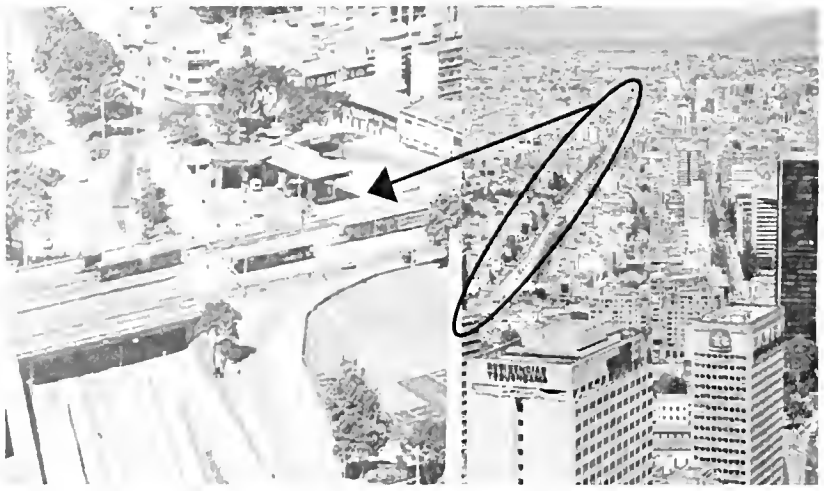

Figure 1. TransMilenio BRT Caracas Corridor

transportation options, this strategy, called "mobility strategy," was designed to achieve larger societal objectives such as enhancing public spaces, improving social integration, and developing a sense of ownership and pride around redeveloped urban form.

A cornerstone of the administration's mobility strategy was the implementation of a high level of service, BRT system. This required the revamping of a prior initiative implemented between 1988 and 1992, which provided exclusive lanes for bus operations. The 16 kms (9.94 mi) of lanes traversed the city's CBD and connected the south and north parts of town. More than a network of bus lanes, the Troncal Caracas acted as a high capacity collector fed by routes needing to cross the city rapidly (Ardila and Rodriguez, 2000). Passenger flows exceeded 36,000 passengers per hour on a given direction during the peak period (Ardila and Rodriguez, 2000), but the system lacked an operations management plan, allowing free entry to operators meeting specific bus size requirements (Rodriguez and Ardila, 2002). The infrastructure itself and the bus stops were not adequately maintained, traffic lights were not synchronized and gridlock was common in several streets crossing the busway (Ardila and Rodriguez, 2000). Nevertheless, average bus speeds in 1999 were 24 kilometers per hour (14.9 mph), significantly higher than the citywide average.

Concerned with an oversupply of the transit service, poor environmental and safety conditions, and decreasing vehicle speeds, the Bogotá city government decided to upgrade mass transportation by embarking on extensive investments to support a BRT system. The uniqueness of Bogotá's case lies in the transformation of its old system into an integrated system. The Caracas corridor (Figure 1) revolutionized an undesirable mobility system (e.g., aesthetically displeasing, with high noise and diesel exhaust levels) into a new BRT system with significantly lower travel times, lower noise and fewer greenhouse gas emission levels (Rodriguez and Targa, 2003). The BRT is now a source of local pride.

Complementary Urban Policies

The BRT system is part of a comprehensive strategy that includes restraining the use of private cars, improving air quality, providing urban and natural spaces for individual recreation and fare, and the provision of public space and non-motorized transport facilities. At a glance, ancillary policy measures include:

- A partial ban on peak-hour auto use. This license plate-based private vehicle ban applies to 40 percent of the vehicle fleet during peak hours on weekdays. There is also an annual car-free weekday.

- The reclamation of public use of spaces previously appropriated by automobiles (such as sidewalks) or neglected by former city authorities (such as parks and plazas).

- The implementation of a 350-km bikeway network, one of the largest in the world.

Bogotá's strategy was designed not only to provide competitive alternatives to auto-based

Source: El Tiempo and IDU.

Figure 2. Public Spaces

mobility, but also to achieve larger societal objectives such as enhancing public spaces, improving social integration, and developing a sense ownership around redeveloped urban form. In the words of its former mayor, Enrique Peñalosa, who left his office with a record approval rating, the strategy consisted of creating a "city environment where the majority of people will be as happy as possible" (Peñalosa, 2002). He visualized that people would be happier in healthier, safer, and more enjoyable places in which to live, work, shop, and socialize. One of the means to achieve this objective was to transform the transportation system, and to reverse the trend towards an increasingly auto-oriented transportation system (Peñalosa, 2002). Perhaps for this reason, 42.5 percent of the city's investment budget (US$ 1.8 billion for the three-year term) was devoted to the ancillary policy measures described above (Ardila and Menckhoff, 2002).

One of the most polemic policies, but at the same time one of the most emblematic ones of that administration, was the reclamation of public use of spaces. Consistent with several planning concepts hinging on urban design and city form as an input to comfortable, navigable, and participatory urban public spaces (Whyte, 1988; Lynch, 1985; Jacobs, 1961), the former Bogotá mayor thought that a quicker and more effective way to achieve quality of life was to invest in public spaces. To accomplish this, the reclamation of public use of spaces included the reconstruction of 1,123 parks, the implementation of a car-free street in the historic CBD, the construction of wide and continuous pedestrian sidewalks, including a 17-km pedestrian greenway through poor neighborhoods (Figure 2, top), and the redevelopment of a 20-hectare park in a crime-ridden area (Figure 2, bottom) by demolishing more than 600 deteriorated houses (Ardila and Menckhoff, 2002).

Another key project for the city is the implementation of one of the largest permanent bicycle network in the world (Figure 3), a 350-km bikeway network, intended to capture 30 percent of the total daily trips in the city. This travel mode share is similar to the one in Copenhagen, where a 300-km network captures 34 percent of the total daily trips. Considering the year-round mild climate, the flat valley where the city is located, and the high urban density that makes most of the trips being relatively short, the demand has currently responded with increases on the proportion of non-motorized trips. More than providing alternative and sustainable transportation options to mobility, the assembling of the bikeway network and extensive wide sidewalks were also conceived as measures to improving pedestrian and bicycle

Source: El Tiempo.

Figure 3. Bikeways

Source: Sandoval and Hidalgo (2002)

Figure 4. TransMilenio BRT Stations

accessibility to BRT stations and swaying people to leave their cars at home. Anecdotal evidence suggests that approximately 10 percent of the regular BRT system riders have switched from private cars to TransMilenio, Bogotá's mobility strategy.

Bogotá's BRT System

The mass transit policy element TransMilenio, is a BRT system resulting from a successful public-private partnership, with the government funding the infrastructure and overseeing long-term planning functions, and private contractors bidding for the operation of a handful of BRT lines on a cost-plus basis (Rodriguez and Targa, 2003). The system comprises specialized infrastructure, including exclusive lanes for high-capacity articulated buses privately operated with an off-board fare collection system.

The first phase of the system operates with 62 stations, 470 articulated buses, and 300 feeder buses. The vehicles operate in the central lanes of urban roads, and are longitudinally segregated from general traffic. Stations are located in the median, approximately every 500 meters, with pedestrian access provided by overpasses, tunnels, or signalized intersections (Figure 4). Walkways, plazas, and sidewalks are also constructed to supply pedestrian and bicycle access (Sandoval and Hidalgo, 2002).

With a flat fare of 1,000 Colombian pesos (US$0.33), revenues are sufficient for the participating private bus companies to be profitable. Simultaneously, a new public authority for planning, developing and controlling the system was created (TransMilenio S.A.). TransMilenio began operations in December 2000. The system moves approximately 800,000 daily trips over 42,4 km (26.2 miles) of busways, and carries more travelers than entire mass transit systems in many other cities around the world (IEA, 2002). Figure 5 shows the first phase of the system (38 kilometers: 23.6 miles), which includes three corridors: Caracas, Calle 80 (80th street), and Autopista Norte (north highway).

The first phase of the system cost around US$5 million per kilometer (US$ 8.1 million per mile), and its net economic benefits accounted for US$1.2 billion with a social rate of return of 60.9% (CONPES, 2000). Similar to any transportation project, the most significant impact of the system for its users has been travel time savings. Commercial speeds increased from 12 kilometers per hour (7.5 mph) to 26.7 kilometers per hour (16.6 mph) in the Calle 80 and Caracas corridors. This

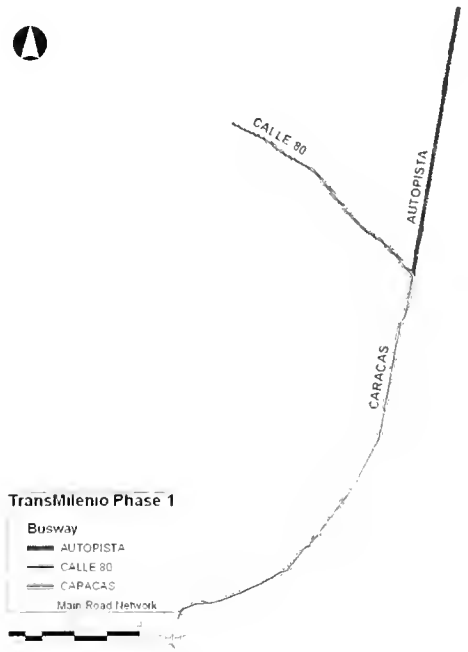

Figure 5. TransMilenio, First Phase

increase in bus speeds allowed for a 32 percent reduction in average trip times for users of the system (Sandoval and Hidalgo, 2002). Additionally, comparisons between before and after system implementation have shown a significant reduction in accident and air pollution levels. Between 1999 and 2001, fatalities in the BRT corridors resulting from traffic accidents were reduced by 89 percent. Similarly, injuries and the number of collisions were reduced by 75 and 79 percent, respectively (Sandoval and Hidalgo, 2002). Contamination and emissions such as sulfur dioxide, nitrogen oxides, and particulate matter were reduced by 43, 18, and 12 percent respectively (Sandoval and Hidalgo, 2002).

Extensions are planned over the next 13 years, when a 388-kilometer (241 miles) BRT network will be completed. This network system will cover 80% of the daily transit trips in the city (5 million trips per day), with a capital investment of more than US$2.9 billion. The infrastructure component of the project (US$1.9 billion) is being financed by local and national public funds. The city covers 33 percent of the total cost via local fuel taxes, and the national government is contributing the remaining 67 percent.

Although there are several operational and cost-efficiency qualities of the system, one of the most important characteristics was its impressive implementation time. In less than three years, the first phase of the BRT system was planned, built, and inaugurated. Additionally, the implementation process did not suffer any significant change in design or construction delays. This speed has come at a cost, though. For example, both the beneficial and deleterious impacts upon the neighborhoods and property owners that have resulted from the system were neglected in the evaluation and planning process. Anecdotal evidence also suggests that there was little community participation and poor quality control in the planning process. As a result, the first phase of the system was successfully implemented without any substantial compensation to affected parties.

Another apparently neglected aspect of Bogotá's BRT system is its potential to spur land development. Although the planning of the BRT system took into account the location of major activity nodes, the reverse relationship, how BRT can promote additional dense development along its corridors was neglected. This omission is somewhat surprising if one considers that land development induced by BRT was the cornerstone of Curitiba's success. In Bogotá's case, expediency and practicality dominated the discourse around the BRT station. Furthermore, aside from Curitiba, there is scant evidence of the relationship between BRT and its land development potential.

From the perspective of planning, it is interesting to perform a posthoc evaluation of how the BRT system is related to land development outcomes such as land uses and values. Transportation planners and policy makers have relied on the notion that transportation improvements enhance accessibility, and by doing so increase the values of the nearby properties. However, the extent of these impacts for BRTs, and the differentiation with proximity-related impacts, are largely unsubstantiated by empirical evidence. It is this lack of existing research, and the increasing relevance of BRT systems as transportation mobility solutions for several cities around the world, that motivated the empirical analysis conducted in this paper. An evaluation of accessibility impacts provides first-hand empirical evidence of the importance of transportation policy alternatives on land use. This information will strengthen the planning process for urban transit systems and will be valuable for understanding the local conditions for which innovative land-based tax instruments, such as value-capture, will be most useful.

Valuation of Access to TransMilenio

As in several other studies, we adopt a hedonic price model approach to empirically evaluate the capitalization of accessibility effects of Bogotá's BRT on residential property rents as a measure of land values. Based on the theory of the market for heterogeneous goods (Rosen, 1974), the hedonic technique allow us to estimate prices of goods that are not explicitly exchanged in observable market transactions, such as accessibility to transportation

Variable	Definition	Mean	Std. Dev.	Coeff.	t-value
Measures of value					
RENT	Rent offered price ($Col 1,000,000)[1]	0.5	0.4		
Structural attributes					
ULAREA	Usable living area (square meters)	77.8	44.1	0.005***	9.96
BEDS	Number of bedrooms	2.2	1.1	0.034**	2.05
BATHS	Total number of bathrooms	1.5	0.7	0.095***	3.66
LROOM	Dummy variable indicating if property has both living and dinning room	5.5%		0.094	1.41
AGE	Dummy variable indicating property < 10 years of age	44.1%		0.084***	3.30
Neighborhood attributes					
STRATUM[2]	Ordinal variable for socioeconomic stratum (from 1 to 6)	3.0		0.124***	5.02
POP_DENS	Population density (1,000 people per square kilometer)	16.0	7.4	-0.006**	-2.05
EMP12_DENS	Primary and secondary sector employment density (1,000 jobs per square kilometer)	5.6	4.4	-0.015***	-3.34
EMP3_DENS	Tertiary sector employment density (1,000 jobs per square kilometer)	24.8	24.0	0.001	1.14
COMER_%	Percentage of area dedicated to commercial use	1.0	4.3	0.007**	2.04
RESID_%	Percentage of area dedicated to residential use	0.6	3.9	-0.003	-0.69
INST_%	Percentage of area dedicated to institutional use	4.8	6.9	-0.004**	-2.38
POVER_%	Percentage of area under base line poverty condition	0.4	2.2	-0.010	-1.55
ROB_RES	Number of break-ins on residential properties per year and 1,000 people	0.2	0.1	-0.804***	-3.01
ROB_PER	Number of robberies to individuals per year and 1,000 people	2.5	1.0	0.133***	7.29
HOMICIDES	Number of homicides per year and 1,000 people	0.6	0.5	-0.143***	-2.67
BUSWAY	Dummy variable indicating property along Caracas corridor (=1, 0 = otherwise)	87.9%		-0.033	-0.40
Accessibility					
LOCAL_ACC	Network access distance from property to nearest BRT station (Km.)	0.8	0.5	-0.207**	-2.38
REG_ACC	Network access distance from nearest BRT station to trip destination center of gravity for each station in the AM peak period (Km.)	5.3	1.5	0.013	0.62
DIST_CBD	Network access distance from the nearest BRT station to the Financial District station (76th street)	4.6	3.1	-0.015	-1.34
DIST_DT	Network access distance from the nearest BRT station to the down town station (13th street)	4.2	3.2	-0.008	-0.55
Proximity-Related					
DIST_BUSW	Straight distance from property to busway (km)	0.6	0.4	0.301***	2.99
Data					
DATA	Dummy variable indicating if data was collected by field-visual inspection (=1, 0 = otherwise)	35.8%		-0.001	-0.04

N =494. [1] US $ 1 = $Col 2,280 of 2002 (average for February-April period). [2] The mean corresponds to the median. ***, **, and * denote coefficient significantly different from zero at the 1%, 5%, and 10% level of significance (two-tail test), respectively. Intercept is equal to -1.820 (t-value=-8.09). R^2 is equal to 0.74. See Notes, facing page.

Table 1. Description of Variables, Summary Statistics, and Hedonic Model (semi-log)

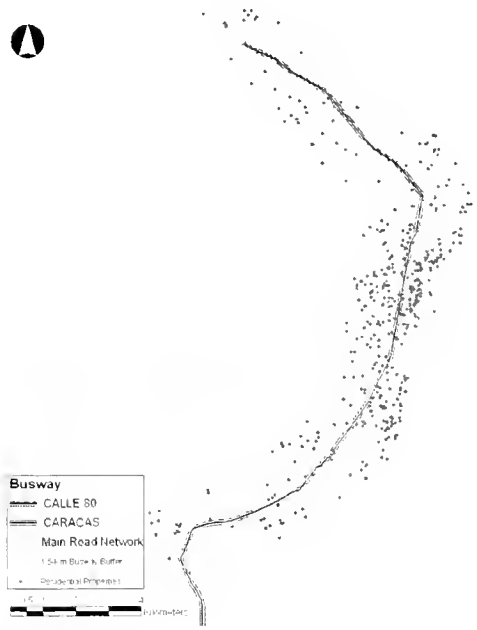

Figure 6. Area of Study

systems. The basic empirical relationship to be evaluated under this approach is the equilibrium implicit rent of the property as a function of its attributes:

$$P_i = c + \vec{\beta}_S \vec{X}_i^{Structural} + \vec{\beta}_N \vec{X}_i^{Neighborhood} + \vec{\beta}_A \vec{X}_i^{Accessibility} + \vec{\beta}_P \vec{X}_i^{Proximity} + \varepsilon_i$$

where Pi is the rental price of the ith residential property, Xij is the jth attribute for the ith property, , $\vec{\beta}_S$, $\vec{\beta}_N$, $\vec{\beta}_A$ and $\vec{\beta}_P$ are vectors with coefficient estimates for structural, neighborhood, accessibility, and proximity-related effects or attributes (implicit empirical marginal price for each attribute), c is the intercept constant term, and ei is the random error term for the ith property. Table 1 presents a description of the variables and the summary statistics of the data employed in this paper.

In order to specify and evaluate the hedonic price function, our empirical examination requires an estimate of land values, as well as information on structural and neighborhood characteristics of residential properties. As a result, we undertook a primary data collection effort. The data collection process began with the selection of a 1.5 kilometer (0.93 mile) buffer area around the two BRT lines (Caracas and Calle 80 corridors). Information regarding residential advertised rent prices and structural attributes was collected for all properties available for rent within this buffer area. The final data set consists on a sample of 494 multi-family residential properties surveyed from February to April of 2002 (Figure 6).

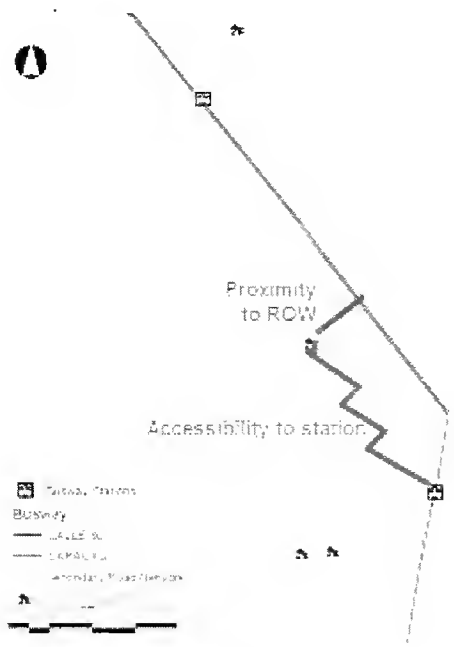

Figure 7. Accessibility & Proximity

Table 1. Notes:

a) 32 missing values (6.5%) from ULAREA were filled by best-subset regression (imputed). Similarly, the 23 missing values (4.7%) from the dummy AGE variable were set to the median. For each of these two variables dummy variables are used in the models to capture the effect of these imputed observations.

b) Rent offered price and structural attributes were collected between February and April of 2002. Socioeconomic variables such as population and employment data are from 1998, while crime data are from 2001.

c) Neighborhood attributes, except Stratum and Busway, were weight-assigned from TAZ-level to 250-meter buffer areas around residential properties.

Local access distance to BRT stations was measured based on the shortest roadway-based path from each residential property to the nearest BRT station, rather than a mere Euclidean distance (Figure 7). In addition to accessibility to BRT stations, Euclidean distance from the residential property to the BRT right-of-way was used as a measure of nuisance proximity-related effects such as noise and air pollution (Figure 7). Structural attributes include usable living area (in square meters), number of bedrooms, total number of bathrooms (including half baths), and dummy variables for living and dining room area, and if the property is less than 10 years old. Neighborhood attributes include socioeconomic stratum, population and employment density, percentage of urbanized area dedicated to retail, residential, or office uses, and crime data such as homicide rates and robberies.

Results from the semi-logarithmic hedonic price functional form using OLS regression suggest that the current valuation of local access to Bogotá's BRT system is capitalized into asking rent prices. Particularly, the parameter estimated suggests a monthly rental discount of 1.87% for every additional 0.1km (328 feet) from a BRT station, all else being equal. Evaluated at the mean rental asking price (Table 1), this translates into an elasticity of -0.16.

By determining the capitalization of positive BRT effects (local access to BRT stations), the localized evidence from this study provides, on the one hand, tools for exploring the usefulness of innovative land-based tax instruments. For example, a value capture tax that theoretically should hinge on the capitalization of positive benefits on land values from infrastructure improvements is validated from the empirical evidence presented on this paper. Local governments and local transit agencies could justify the nature and magnitude of charges derived from value capture, known as valorizacion , to parcels nearby transportation improvements or new construction facilities.

On the other hand, the capitalization of access on land rents also suggests that there is a potential for future land development. Similar to Curitiba's experience, where complementing land-use initiatives were taken in order to induce desirable urban forms and land uses around BRT stations or along corridors, Bogotá's future BRT extensions have a large potential to influence future land development and urban growth. For example, a world of unexplored proactive land use planning for a workable transit-land use nexus, that has been absent from the planning process, should be in the agenda of Bogotá's transit and urban planners. Local officials could take advantage of the land market (e.g., fostering faster and more concentrated urban development) as a response to the capitalization effects from access to BRT stations.

Finally, there are three main limitations of this study that should be underscored. First, the use of cross-sectional data limits the absolute attribution of the premium found on asking rental prices to the presence of the BRT, instead it is an actual measure or valuation of access. Further research (e.g., using time-series data for a before and after study) may determine if the premium detected can be attributed to the presence of the BRT. Second, the use of asking rental prices, instead of actual prices, may bias the results if there is any systematic bias in the difference between asking and market rental price associated with unobservable characteristics on the study. And third, further research should focus on commercial and office land values in order to evaluate the other parts of the expected relationship between accessibility and the land market.

Conclusions

Rather than relying on automobile policies that reinforce patterns of seclusion and isolation, recent experiences in Latin American cities supporting world-class public transportation systems have resulted in the creation of livable spaces with a significant potential to spur land development and future urban growth. In cities like Bogotá and Curitiba, bus transit service has re-emerged as a cost-effective transportation alternative for satisfying growing demands for urban mobility. For

example, Bogotá's BRT has allowed for a 32 percent reduction in average travel times for users of the system in addition to significant reduction in accident and air pollution levels along the busway corridors. In addition to serving its explicit goal of providing mobility, this revolution for provision of high quality bus transit service has shown its potential for stimulating land development and livable spaces. Despite cases like Curitiba, where BRTs have played an integral role in the successful articulation of an integrated land use and transport strategy, there is scant evidence of the relationship between BRT and its land development potential. This paper provides first-hand empirical evidence on the evaluation of how the BRT system is related to land development outcomes such as land values.

Previous research suggests that the impacts of access to BRT facilities on the nearby land value and use have been minor. However, new BRT systems like the one in Bogotá feature intensive infrastructure facilities and their effects in terms of accessibility and mobility have been impressive. Based on this previous premise, this paper finds evidence that the current value of accessibility to Bogotá's BRT are capitalized into residential property rental prices. Given the empirical housing rent-land value relationship, these results suggest that property rental prices are a theoretical representation of the land value for housing services.

To the degree that the results from this study can be generalized, this evidence has a wide range of practical applications, from determining the usefulness of innovative land-based tax instruments that hinge on the capitalization of positive BRT effects, to informing policy makers about the land development consequences of transportation infrastructure alternatives. Recent studies about incentive taxation have shown that value capture represents an alternative approach to capital cost recovery that has not been fully explored and examined in the tax policy context. Batt (2001) noted how only a few studies, if any, have recognized the relationship between transportation, land use, and taxation. However, there is enough evidence from studies that show the merits of value-capture as an instrument of public infrastructure finance (Allen, 1987; Cervero, 1994; Johnson and Hoel, 1985).

In addition to being an efficient method for public funding of transit infrastructure, value-capture also encourages faster and denser urban development in areas in close proximity to BRT lines, assuming that density caps are not a constraining factor. Given the higher rents on land values in locations with good access, it is expected that landowners will try to recover their investments rather than hold them for speculative gain (e.g., BRT fosters faster and more concentrated development). This is always a desired outcome for policy makers regarding transit-oriented developments because it has implications for the viability of transit operation. However, to ensure this urban development outcome it is necessary to complement this taxation policy with mechanisms such as higher density caps and mixed-use land-use zoning.

The extent to which positive effects of Bogotá's BRT system are capitalized into property values provides a promising approach for public institutions to fund BRT extensions and general transit infrastructure. With extensions planned over the next 13 years, issues related to both its beneficial and deleterious impacts may become of growing concern to both the affected public and to transit planners. When completed, 85 percent of Bogotá's population will be located in a 500-meter area of influence of the BRT system, where positive and negative impacts are expected to influence property values and future land development.

Acknowledgments

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Master's Projects, 2003

The following is a list of Master's Projects prepared by students who graduated from the Department of City and Regional Planning at UNC-Chapel Hill in 2003. To obtain a copy of one or more of these projects, contact Carolyn Turner at (919) 962-4784.

Katherine Anthony. Neighborhood Revitalization Through Preservation: A Review of the National Trust for Historic Preservation's Main Street Model for Urban Neighborhood Revitalization

Tucker Bartlett. Commercial Real Estate Lending Through the New Markets Tax Credit: The Development of An Underwriting Manual for Self Help

Benjamin Bearden. Evaluating Wetland Function Using Geographic Information Systems: A Method for Land-Use Planning

Badi Bradley. Local Economic Development Through Joint Action: Latino Businesses and the Greater Mount Airy Chamber of Commerce

Tracy Ostrowski Clarke. Planning in North Carolina's Small Towns and Rural Communities

William Russell Clegg. NPDES Phase II and North Carolina Counties

Anna Davis. Developing Wildfire Mitigation Planning Elements & Strategies for Telluride, Colorado

Kenneth Ho. Brownfields Redevelopment in the United States and Germany: A Case Study of the GASAG Berlin-Mariendorf Site

John Holmes. Improving the Process of Urban Neighborhood Revitalization in the United States Looking at Germany's Stadtebauforderungsgesetz

Katherine Johnson. Affordable Housing in Downtown Asheville: City and Developer Opportunities

David Kiddoo. Do Biases Exist in the Location of Affordable Housing? An Examination of the Low-Income Housing Tax Credit in North Carolina

Sara Liechty. Planning for Earthquakes in the Wasatch Front

Joel Mann. Building Better Cities Through Design Regulations: Form-Based Zoning and Accommodating Design Concerns With Land Use

Bhavna Mistry. Community Land Trust Potential Homebuyer Housing Comparison Marketing Tool – An Economic Model to Understand the Costs and Benefits of CLT Homeownership

Samuel Mordka. Affordable Housing for Faculty and Staff of the University of North Carolina at Chapel Hill

James Mosdell. Enhancing Historic Preservation

Benjamin Noble. Downtown Redux: The Conversion of Vacant Office Buildings to Residential Uses in Center City, Philadelphia

David Paine. Evaluating a View Corridor's Effect on Development in the Austin Central Business District

Katye Parker. Watershed Protection in Orange County, North Carolina: An Examination of Current Practices, Issues, and Solutions

Amy Paulsen. Monster Homes: How Can Communities Control The Large Home Phenomenon?

Andrea Petersen. Re-Imagining Downtown Planning for Lower Manhattan in the Wake of September 11th

Dhanya Purushothaman. Development Impact Fees and Housing Affordability: Untangling the Paradox Within

Benjamin Rasmussen. The Impact of Neotraditional Neighborhood Design on Travel Behavior

Jeremy Raw. Integrated Multi-Modal Transportation Planning: A Spatial Approach

Marta Rocha. The Effects of Trucking Firm Financial Performance on Safety Outcomes

Adam Rust. The Geography of Economic Growth and Mortality in the United States

Wendy Smith. An Essential Guide to Plan Quality: A Procedure for Plan Quality Evaluation and A Comparative Analysis of Six Comprehensive Plans

Felipe Targa. Examining Accessibility and Proximity-Related Effects of Bogota's Bus Rapid System Using Spatial Hedonic Price Models

Jonathan Toppen. Measuring the Cost-Effectiveness of Foreclosure Prevention Counseling

Chang Yi. An Evaluation of Virtual Representations of Transit Agencies: Are Internet Sites of Transit Agencies Functions of Their Physical Attributes?

Ki-Young Yoo. Method for Identifying Industry Clusters: Assessment of the State of the Art

Award Winners

American Institute of Certified Planners Outstanding Student Award
Tucker Bartlett

North Carolina Chapter of the American Planning Association Outstanding Student Award
Katherine Anthony

Louise Venable Coker Award for Best Masters Project
Felipe Targa

Bruce and Chris Egan Information Technology Award
Joel Mann

Outstanding Class Contributions Beale Award
David Paine

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